

Assessment of Nutritional Status of Women at Reproductive Age in Ardebil Province, Iran

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Abstract: Nutritional assessment of women at reproductive age should identify factors that may affect fertility, periconceptional health and pregnancy outcome. The aim of this study was determination of anthropometric factors, calorie and nutrients intake as well as food habit. In a descriptive cross-sectional study, 1906 females (939 urban and 967 rural) at reproductive age were selected by multi stage sampling method. Variable including age, anthropometric factors (e.g., height, weight), calorie and nutrients intake as well as the food habit were measured for each case in 2005. Height and weight were obtained using a portable digital scale and a portable digital Stadiometer following standard technique. Body Mass Index (BMI, in kg m^{-2}) was calculated from the women height and weight. In order to determine dietary intake, information of 24 h dietary food recall was recorded for three successive days. The prevalence of food frequency among women was evaluated using specific questionnaire. Statistical comparison of means among groups was performed with ANOVA and t-test. Weight and height of urban women were more than rural women, significantly ($p < 0.05$). With increase of age, BMI and obesity were increased, significantly ($p < 0.05$) and observed in urban women up 35 years old. The mean of daily iron and protein intakes of women were adequate. However the mean of fiber, folate, vitamins B2 and B6, calcium, zinc, selenium and calorie intake were less than dietary reference intakes ($p < 0.05$). Intake of some food groups such as bread, dairy and milk were adequate, but intake of unsaturated fat and fish were fewer in dietary women. In Ardebil province 13.7, 41.45, 29.4 and 15.3% of women at reproductive age had underweight, normal, overweight obese, respectively.

Key words: Anthropometric factors, ardebil, women, reproductive, overweight, nutrients

INTRODUCTION

Nutrition is important in reproduction; including the safe delivery of infants. Nutritional assessment of women at reproductive age should identify factors that may affect fertility, periconceptional health and pregnancy outcome (Susan and Hally, 1998). The reproductive axis is closely linked to nutritional status, especially undernutrition in the female and inhibitory pathways involving detectors in the hind brain suppress ovulation in subjects with weight loss (ESHRE Capri Workshop Group, 2006). Maternal nutritional status is important for the health and quality of life of women and for the health of their newborn infants (Institute of Medicine, 1990). Based on the dietary and anthropometric results, some study was showed that malnutrition is a common feature among low income rural women (Islam *et al.*, 2004). Recent descriptive studies suggest that Iran has geared in the nutrition and epidemiological transition processes. Therefore, while the problems of undernutrition (e.g., growth retardation and micronutrient deficiencies) still exist, the burden of overweight/obesity and diet-related chronic diseases is

increasing. The prevalence of overweight (body mass index \geq 85th reference percentiles) among urban 15-39 and 40-69 year olds is estimated at about 22 and 40%, respectively. Corresponding values in rural areas are 16 and 26%. The transition seems faster among female population at national level (Rashidi *et al.*, 2005). Some study in different area of Iran that showed overweight and obesity were very common in adult females (Sotoudeh *et al.*, 2005). The aim of this study was determination of anthropometric factors, calorie and nutrients intake as well as food habit of women at reproductive age.

MATERIALS AND METHODS

In a descriptive cross-sectional study, 1906 females (939 urban and 967 rural) at reproductive age were selected by multi stage sampling method in Ardebil, Iran. Variable including age, anthropometric factors (e.g., height, weight), calorie and nutrients intake as well as the food habit were measured for each case in 2005. All subjects signed an informed consent statement before

participating in the study. Height and weight were obtained using a portable digital scale and a portable digital Stadiometer following standard technique. Height and weight were measured without shoes and in a light summer uniform in a private room by trained interviewers. Height was measured to the nearest 0.5 cm using a portable Stadiometer. Weight was measured to the nearest 0.1 kg using portable Soenle digital scales with a range of 0-200 kg. Body Mass Index (BMI, in kg m^{-2}) was calculated from the women height and weight. BMI the most widely accepted indicator was used to assess obesity among women (Kuczmarski *et al.*, 1995; WHO, 1995). BMI was classified into four categories as follows: <18.5 (underweight), $18.5-24.9$ (normal weight), $25 \leq \text{BMI} < 30$ (overweight) and $\text{BMI} \geq 30$ (obesity) (WHO, 1995). In order to determine dietary intake, information of 24 h dietary food recall was recorded for 3 successive days. Mean daily dietary intake and food composition were estimated using Iranian Food Processor software. The prevalence of food frequency among women was evaluated using specific questionnaire. The participants were asked to indicate consumption of specified food in daily, weekly, monthly and yearly bases. The selected frequency choice, given by the subjects for each food item from the food groups, was then converted to a weekly intake. Statistical analyses were performed using SPSS version 13 for windows. Results are expressed as means \pm SD. Statistical comparison of means among groups was performed with ANOVA and t-test. Differences were considered statistically significant at $p < 0.05$.

RESULTS

Weight, height and BMI of urban women were more than rural women, significantly ($p < 0.05$) (Table 1). With increase of age, BMI and obesity were increased, significantly ($p < 0.05$). Obesity observed in urban women up 35 years old (Table 2). The mean of daily iron, protein and etc. intakes of women were adequate. However

Table 1: The mean of height and weight in women at reproductive age between two different groups

Variables	Urban		Rural	
	X \pm SD	No.	X \pm SD	No.
Weight *	66.3 \pm 12.9	939	61.7 \pm 12.3	967
Height *	157.4 \pm 8.90	939	156.6 \pm 9.70	967
BMI*	26.8 \pm 4.9	939	25.9 \pm 5.60	967

*Different is significant at the 0.05 level (2-tailed), All Values are mean \pm Standard deviation

the mean of fiber, folate, vitamins B2 and B6, calcium, zinc, selenium and calorie intake were less than dietary reference intakes ($p < 0.05$) (Table 3). Intake of some food groups such as bread, dairy and milk were adequate, but unsaturated fat and fish consumption that is useful for health were fewer in dietary women (Table 4).

Table 2: The frequency of BMI levels in women

Variable	BMI (kg m^{-2})	No.	Age (year)
BMI (kg m^{-2})	<18.5	297	25.4 \pm 6.4
	18.5-24.99	897	29.0 \pm 8.3
	25-30	638	33.3 \pm 9.0
	>30	332	36.1 \pm 8.0

Table 3: The mean of daily calorie and nutrients intake of women at reproductive age in different areas

Variable	Urban X \pm SD	Rural X \pm SD	Total X \pm SD
Calorie (Kcal/day)*	1579.00 \pm 444	1707.00 \pm 467	1644.00 \pm 460
Protein (g)	56.00 \pm 20	59.00 \pm 20	57.00 \pm 20
CHO (g)	225.00 \pm 73	258.00 \pm 83	242.00 \pm 80
Fiber (g)*	9.00 \pm 5	10.00 \pm 6	9.70 \pm 5.7
Total fat (g)	50.00 \pm 23	49.00 \pm 21	49.70 \pm 21
Vitamin B ₁ (mg)	1.10 \pm 0.4	1.30 \pm 0.5	1.20 \pm 0.4
Vitamin B ₂ (mg)*	0.82 \pm 0.4	0.90 \pm 0.4	0.86 \pm 0.4
Vitamin B ₃ (mg)	18.60 \pm 8.8	19.70 \pm 8.7	19.20 \pm 9.3
Vitamin B ₆ (mg)*	0.80 \pm 0.4	0.91 \pm 0.6	0.86 \pm 0.5
Folate (μg)*	62.50 \pm 48.6	67.10 \pm 53.6	64.90 \pm 51.2
Vitamin C (mg)	45.00 \pm 43.9	51.40 \pm 40.4	48.30 \pm 42.2
Calcium (mg)*	397.00 \pm 232.7	447.00 \pm 275.5	432.60 \pm 257.7
Iron (mg)	16.10 \pm 8	18.10 \pm 7.3	17.10 \pm 7.7
Zinc (mg)*	3.30 \pm 1.8	3.40 \pm 1.8	3.40 \pm 1.8
Selenium (μg)*	24.00 \pm 15.6	22.30 \pm 13.7	23.10 \pm 14.7
Potassium (mg)	1162.40 \pm 581.1	1381.10 \pm 675.6	1273.40 \pm 640.1
Magnesium (mg)	83.70 \pm 45.2	95.20 \pm 46.9	89.50 \pm 46.4
Phosphorous (mg)	464.50 \pm 267.2	489.00 \pm 262.2	476.90 \pm 264.9
Calpr (%)	14.50 \pm 4.2	14.40 \pm 7.6	14.50 \pm 6.2
Calcarbo (%)	56.90 \pm 8.7	60.40 \pm 21	58.70 \pm 16.3
Calfat (%)	28.40 \pm 8.6	26.20 \pm 12.4	27.30 \pm 10.8

All values are mean \pm Standard deviation. Calpr = calorie from protein, Calcarbo = calorie from, carbohydrate, Calfat = calorie from fat, CHO = carbohydrate, *Different is significant at the 0.05 compared with dietary reference intakes

Table 4: The mean of food frequency per week in women at reproductive age in different areas

Food group	Urban (X \pm SD)	Rural (X \pm SD)
Milk	3.55 \pm 3.1	3.55 \pm 3.3
Yogurt	4.90 \pm 4	4.90 \pm 4.2
Bread	13.50 \pm 6.7	14.60 \pm 8.8
Rice	4.80 \pm 3.1	4.00 \pm 3.5
Potato	4.50 \pm 3.6	6.00 \pm 5.0
Pulse	2.50 \pm 2	3.00 \pm 2.9
Red meat	2.90 \pm 2.8	2.90 \pm 2.1
Egg	4.40 \pm 3.2	4.80 \pm 4.4
Cheese	6.30 \pm 2.6	6.20 \pm 4.3
Fruits	5.70 \pm 4.3	4.20 \pm 3.9
Vegetables (crude)	3.80 \pm 3	4.60 \pm 3.4
Fish	1.00 \pm 0.7	0.90 \pm 0.5
Poultry	2.60 \pm 2.5	2.60 \pm 2.1
Liquid fat	3.00 \pm 1	1.50 \pm 0.3
Solid fat	10.50 \pm 6.9	9.10 \pm 7.1
tea	21.40 \pm 11.4	20.60 \pm 16.5
soy	0.95 \pm 0.43	1.40 \pm 0.56
Vegetables (cooked)	1.70 \pm 1.4	1.30 \pm 1.0

All values are mean \pm Standard deviation

DISCUSSION

The level of urbanization has been reported to be one of the main predictors of nutritional transition (Popkin, 2001). In agreement with previous studies in developing countries (Monteiro *et al.*, 1995; Popkin, 2001) the present results suggest that women living in urban areas are more likely to be overweight and obese than those in rural areas. Our study showed that the height and weight were in urban women more than rural women and based on BMI, body fat increased with age. This may be associated with different eating patterns between rural and urban population and lower physical activity due to urbanization. The women with high BMI had high energy intake. This study describes a significant shift in the prevalence of overweight among women. Our study has revealed that the prevalence of overweight and obesity among the reproductive age women were about 29.4 and 15.3%, respectively. In similar to this study Belahsen *et al.* showed that the prevalence of overweight was in the age of more than 35 years old (Belahsen *et al.*, 2003). Our result indicates an increase of fat mass in this group age and warns of an increase in obesity-related disease in the future. In adult women, BMI<18.5 is used as an indicator of chronic energy deficiency. The high proportion of women falling below this cut-off value in developing countries shows that women's under nutrition is a staggering problem (Nubé and VanDen Boom, 2003). In study of Minh Hanh observed undernutrition based on BMI <18.5 in middle-aged population of Vietnamese in Ho Chi Minh City (Minh Hanh *et al.*, 2001) that was similar to the present study. Other study showed around 50% rural women in pre-pregnancy state are undernourished (Srivastava *et al.*, 1998). Our results showed underweight as determined using the BMI< 18.5 was observed in 13.7% the population. We observed some nutrients deficiency in dietary of women. Differences within the province among regions, rural and urban areas reflect an increasing availability of inexpensive calorie-dense foods in marginal groups. However, total energy, fiber, folate, vitamins B₆ and B₂, calcium, selenium and zinc were consumed in lesser quantities by women from Dietary Reference Intakes (DRI). A zinc intake was all insufficient in both groups of women, in agreement with the finding of Angus *et al.* (1988). The present study revealed unhealthy dietary habits among women which reflect the dietary patterns of their families. The high consumption of hydrogenated solid fat is common in women. Usually, the largest proportion of women foods consists of bread and or rice; as indicated in this study, the consumption of fruit and vegetables is low in most families. Our findings are consistent with many recent studies among young people

of different populations that have reported unhealthy dietary habits (Yang *et al.*, 2005 ; Omar Rager, 2001). Food frequency showed that bread was the main food source in women. In the Islamic Republic of Iran has undergone a rapid nutrition transition. This is suggested to be secondary to the rapid change noted in fertility and mortality patterns and to urbanization. This transition has led to a considerable imbalance in food consumption with low nutrient density characterizing the diet and over-consumption evident among more than a third of households (Ghassemi *et al.*, 2002). The few studies performed of dietary habits among Iranians have shown similar patterns in the general population (Sheikholeslam *et al.*, 2004). Other study in rural Iranian women showed average energy and protein intakes were inadequate (Djazayery *et al.*, 2001). The similar to our study the study of Flores *et al.* (1998) showed the mean energy consumption of women was 1,721 kcal per day and vitamin B₆, folate, calcium intake was less than Recommended Dietary Allowance (RDA) (Flores *et al.*, 1998). Of particular interest in the context of our study are the direct associations between overweight and increase of age. In Ardebil province 13.7, 41.45, 29.4 and 15.3% of women at reproductive age had underweight, normal, overweight obese, respectively.

CONCLUSION

We concluded that percentage of overweight and obesity among women at reproductive age in urban area were more than rural area. The present results suggest that women at reproductive age living Ardebil province have some nutrients deficiency in consumption dietary.

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